

ABSTRACT OF THE DISCLOSURE

A vacancy injecting process for injecting vacancies in template layer material of an SOI substrate. The template layer material has a crystalline structure that includes, in some embodiments, both germanium and silicon atoms. A strained silicon layer is then epitaxially grown on the template layer material with the beneficial effects that straining has on electron and hole mobility. The vacancy injecting process is performed to inject vacancies and germanium atoms into the crystalline structure wherein germanium atoms recombine with the vacancies. One embodiment, a nitridation process is performed to grow a nitride layer on the template layer material and consume silicon in a way that injects vacancies in the crystalline structure while also allowing germanium atoms to recombine with the vacancies. Other examples of a vacancy injecting processes include silicidation processes, oxynitridation processes, oxidation processes with a chloride bearing gas, or inert gas post bake processes subsequent to an oxidation process.